DOCUMENT RESUME

ED 040 813 RC 004 459

TITLE Camping Education: An Opportunity for Non-graded Organization, Process Approach, Flexible Scheduling, and Other Features of Quality Education.

INSTITUTION Northern Michigan Univ., Marquette. School of Education.

PUB DATE Sep 69
NOTE 64p.

EDRS PRICE EDRS Price MF-$0.50 HC-$3.30
DESCRIPTORS Camping, Cooperative Planning, Curriculum, *Educational Programs, *Elementary Grades, Flexible Schedules, Individualized Instruction, Instructional Materials, Learning Experience, *Outdoor Education, Program Evaluation, Questionnaires, *Resident Camp Programs, *Secondary Grades, Student Evaluation, Student Participation
IDENTIFIERS Michigan

ABSTRACT

Material presented in this document is primarily concerned with those aspects of an educational program which are related to individualized learning, "learning how to learn," direct observation of physical and human phenomena, wide use of educational media, vigorous discussions, and flexible environments. The document is based on the Pierce Camp Program held for 5 days in July of 1969 at the Outdoor Center at Wells State Park in Michigan. Sections on camping education are (1) reasons for the program, (2) curriculum for the program, (3) grouping of students, (4) student participation in planning, and (5) evaluation for the program. Suggested activities, grocery lists, and an evaluation questionnaire are also included. The document contains a bibliography of ERIC documents and their availabilities, and provides annotated citations for other useful publications. Financial details of the 1969 Pierce Camp Program and a sample student handbook are also appended. (AN)

ED 040813

CAMPING EDUCATION: AN OPPORTUNITY FOR NON-GRADED ORGANIZATION, PROCESS APPROACH, FLEXIBLE SCHEDULING, AND OTHER FEATURES OF QUALITY EDUCATION

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September, 1969

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Outdoor Education Camp
Wells State Park, 1969 (student handbook) green pages

INTRODUCTION

The John D. Pierce School is a department of the School of Education at Northern Michigan University. Its major function is to carry on a program of research, development, and experimentation in elementary and secondary education, and to use this program to support University efforts in instruction and service.

For many years the Pierce school year has extended from mid-September through July, in effect creating an eleven month school year. Recently an effort has been made, in anticipation of lengthened school year plans becoming common, to develop curriculum which would take advantage of the warmer weather and other characteristics of summer. In 1966 and 1967 Pierce classes used the NMU Field Station at Cusino Lake in Alger County for one day outdoor programs, with a concentration on science activities. In 1968 the first camping program was held at Three Lakes, west of Michigamme in Marquette County, for three days with a Center 12 (12-year old) class. In July, 1969, the second camping program was held for five days at the Outdoor Center at Wells State Park, located on Green Bay midway between Escanaba and Menominee. This publication is based upon that program.

It was the opinion of the Pierce faculty who worked on this project that a camping setting was ideal for implementing certain characteristics of a good educational program, including individualized learning, "learning how to learn", direct observation of physical and human phenomena, use of a wide variety of learning materials, vigorous discussions, and flexible environments, among others.[1] The material in this booklet is primarily concerned with those aspects of the program which are related to the attainment of these and similar characteristics.

The Pierce faculty wishes to express its thanks to the personnel of the school camping programs of the public schools of Green Bay, Wisconsin and Menominee, Michigan, both of which contributed to the thinking behind this booklet through visits of Pierce faculty; and to Rod Smith, Supervisor of Education and Training, and Paul Challancin, Regional Information Officer, both of the Michigan Department of Natural Resources, and to the personnel of their departments who assisted in the program and who are listed in the green pages of this booklet.

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[1]John I. Goodlad, "The School Vs. Education," Saturday Review, April 19, 1969.

WHY CAMPING EDUCATION?

A sizable number of school districts, although not a majority, provide camping education programs, usually for their students in upper elementary or junior high classes. These programs are time consuming, present problems of finance and liability, require unusual personal sacrifices from teachers, and introduce other problems into school operation. Why, then, do so many schools have such programs?

Perhaps the major reason is that they provide an educational program which is, in a sense, educationally "supercharged" at the same time that many of the usual school and other stresses on the students are relieved. Children can focus their entire attention on the learning situation in a relatively low pressure setting. The hours of "school time" in a one week camping program equal several weeks of regular school time, perhaps a quarter of a year. During this program children do not need to cope with family or neighborhood pressures. In a sense they can socially get off to a fresh start, in a setting which is new enough so that new relationships can be established with their peers, their teachers, and their environment.

In addition, it is possible to learn much in the outdoor setting that would be difficult or impossible in the classroom. Such learnings are not limited to science, conservation, and physical education, but are also possible in the language arts, fine arts, social sciences, mathematics, and other curriculum areas.

The program described in this report was developed, in part, to try out the application of certain new trends in education to the outdoor education setting, as well as the application of some older but still sound practices. This program was essentially nongraded, used large group-small group-individual organization, involved students in planning, and was planned to meet as broad a spectrum of curriculum goals as possible.

Thirty-three junior high age (7th and 8th grade) students participated in this program for one school week, Monday morning through Friday afternoon. The Outdoor Center at Wells State Park, Cedar River, Michigan, was used. The staff consisted of two classroom teachers, one physical education teacher, one administrator, six student teachers, one teacher aide, and a volunteer cook.

It is not the intention of the Pierce faculty to present a "how to do it" book on school camping, but rather to present descriptions of several tried and proven practices which it is believed would help any school program to be as productive as possible. Many of these practices could also be used in outdoor education programs which do not involve camping.

CURRICULUM

Several years ago the faculty of the Pierce School began a new approach to curriculum improvement. Rather than begin with study of each subject matter area, they chose to begin with the assumption that education is essentially a process of changing students---from nonreaders to readers, from self-centered to socially responsible, from illogical to logical, etc. The two major areas of desired change were defined as skill acquisition (reading, speech, mathematics skills, handwriting, etc.) and development of reasoning processes (defining of problems, determination of effective methods for obtaining needed information, observation and description of various aspects of the environment, identification of similarities or differences, determination of cause and effect relationships, etc.).[1]

One of the following phases of this curriculum study was the identification of the kinds of school activities and experiences which would be most productive in meeting the objectives which were established. Modifications of the school's organizational pattern were also made to permit greater flexibility in providing appropriate activities.

It was felt that a good school camp program could provide activities which would contribute to the attainment of certain of the educational objectives of the school better than any other type of activity. That is, there are certain objectives which can best be attained in the classroom, and others which can be better attained in the outdoors. The latter are not confined to any one curriculum area, but cut across subject matter areas generally, as explained in the following pages. Curriculum planners need to keep in mind that a single activity may easily contribute to meeting objectives in several different curriculum areas. An activity which is most closely related to science, for example, may include elements of measuring (mathematics), record keeping and reporting (language arts), and mankind's use of natural resources (social sciences).

The following paragraphs contain examples of the kinds of educational objectives which can be better achieved in the camp setting.

Communications

Although the development of communications skills may not be the major reason for having a camping program, the camp experiences provide a wealth of

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[1] J. D. Pierce, Objectives of Instruction, Marquette, Michigan: John D. Pierce School, 1967.

opportunity for children to practice these skills in a situation in which they will be highly motivated. The normal routine will require students to read, write, speak, use resource tools, and otherwise send and receive communications. The changed pattern of life in camp, with its reduced pressures and closeness to nature, provides an incentive for students to reflect upon some basic philosophical concerns, which in turn will affect their communications. The teacher's major challenge may be the need for awareness of opportunities to develop and use communications sensitivity and skills, and provision of suitable guidance when appropriate to help children improve their skills.

Mathematics

Camp may be a nearly ideal setting for use of mathematics as a symbolic language which enables man to work with his environment. Camp activities may include map construction, map reading, and measuring of distances, quantities, and volume. Advance planning, particularly of meals, requires estimates of quantities required, unit costs, and total costs. Students should be involved in such planning activities so that they can receive maximum educational value from the camp experience.

Science

The relationship between a camping program and science is obvious. The discovery approach, the application of which is discussed in a later section of this report, is easy to apply in the camp setting. Natural parts of the camp program include elements of zoology, botany, chemistry, physical science, earth science, ecology, sometimes archeology, and other sciences.

Social sciences

The social sciences, too, fit naturally into a camp program. Geography and economics and their relationship can be taught in camp as children are led to discover the relationship between natural resources and how man used them to his advantage (or disadvantage). History may fit into camp programs if teachers are aware of the history of the area and alert for evidence of previous local habitation or other opportunities for study of history. Sociology and psychology, at least in a very applied form, will be major areas of learnings in camp, even if not planned. Children often remark following a camp program that they "get to know their teachers and classmates better than ever before." This may, for some children, be the first experience in living in a "mini-society", other than their family, for more than a few hours at a time. The social give and take may be a powerful learning experience, but will also be a challenge to the teacher to maximize educational value.

Health and safety

Schools often list health and safety education as among their most important objectives, yet for a variety of reasons these may not be among the most easily achieved objectives. One reason for this situation may be that it is more difficult to teach about health in the classroom since many of the common health problems encountered by people are not located in the classroom environment. The camp environment, however, presents a wealth of opportunities for students to participate in health and safety related activities.

In the planning stages students can assist in planning proper meals. They can work on program planning to promote adequate rest, balance of activities, and safety rules for swimming and other activities. All students should have instruction before the camp begins in the basic principles of first aid with emphasis on the kinds of problems they will be most likely to encounter. Such instruction will not only help provide adequate care for injuries in camp, but will also make the students more careful through awareness of the consequences of ignorance or carelessness.

During this camp program students will have contact with personal and group sanitation through dishwashing, cabin inspection, and other experiences. These "housekeeping" chores should be utilized as educational experiences.

Other subjects

This is not a complete list of responsibilities. Home economics, industrial education, visual art, music, physical education, and other areas can also be part of the camp curriculum.

It may seem that the curriculum areas which can be profitably incorporated into a school camp program are so numerous that a narrow selection must be made to fit the time available. This is not necessarily so. In many cases a single activity may touch upon several areas. For example, measuring (mathematics) may be used in observing and reporting physical or biological phenomena which might be related to health, and the results communicated in writing. The challenge to the camp staff member, therefore, is to not schedule multitudes of activities in various curriculum areas, but to recognize the full potential of each activity as it contributes to various areas so that it may be as productive as possible. During the operation of the camp the staff can often contribute most by asking the right questions and by helping students to learn how to ask themselves the right questions.

It should also be noted that the total camping program, like any well planned field trip, involves (1) advance planning and (2) follow-up after the program to attain maximum effectiveness. For example, menu planning may be done well in advance of the camping program, and may include learning in science, home economics, mathematics, and health. Evaluation discussions after the program will enable students to review their planning and its effect on the program, and to determinate how the planning could have been improved.

GROUPING OF STUDENTS

A school camp presents a nearly ideal opportunity to apply some of the principles of education that all teachers are aware of, but which are sometimes difficult to apply in the classroom.

For example, we know that groups of people do not learn---only the individual members of the group learn. We also know that how and what an individual learns will vary from one individual to another, regardless of how we may try to make them accomplish the same thing in the same way. There are other similar principles which could also be listed.

It is possible, in many cases, to accomplish the same educational goals through more than one activity. For example, assume that the goal is to help the student observe, identify similarities and differences, and classify natural objects. This goal can be equally well reached through study of animals, wild flowers, birds, trees, or rocks. If such a variety is presented, then the student may choose a topic which is more to his liking (e.g., fits his interests and learning style) better than some other topics. The goals of the program can be attained whatever the choice that is made. The choices made available to students would, of course, depend upon the resources available and competencies of the staff.

Although learning is essentially an individual process, much of the learning which takes place in a camp setting depends upon interaction with other people. Development of social awareness and skills should be a major objective of a camping education program. It may be more productive to have some constant groupings so that each individual will be a part of a group which will last throughout the camp program. Opportunities may also be provided for interaction with other individuals and groups.

The Pierce program in the summer of 1969 used grouping schemes which took these various factors into account. The groupings, pictured on the next page, had these features:

1. The basic group for all activities was the small group. The ideal small group has from five to eight members, but some in this program were smaller, with an average of about four. Some groups were actually smaller than planned because some students were absent during the week of camp. Students were not transferred to other groups to make them more uniform in size because the groups had already been functioning for several weeks of planning. Each small group developed its own program plan, and elected one member each to the program planning and meal planning committees. The group names were the only identification used in the schedule. The planning committee, consisting of the group representatives, teachers, and student teachers, decided that the groups should identify themselves by the names of wild animals found in Michigan,

GROUPS USABLE IN CAMPING PROGRAM

Groups		Activities
Small	Coyotes, Bob Cats, Lynx, Gophers, Antelopes, Fawns, Timber Wolves, Foxes	program building,
Medium, by class & sex	center 12 boys, center 12 girls, center 13 girls, center 13 boys	cabin assignments
Medium, mixed sex		program activities
Large, by class	center 12, center 13	
Large, by sex	all boys, all girls	
Whole camp		meals, swimming, lectures

and that each group should select its own name. The major exception to this recommendation was the selection of "Antelopes" as a name by one of the groups. Each group consisted of students from the same class, primarily to make it easier for them to meet for planning. There were two boys' and two girls' groups per class.

2. There were four cabins available for housing, each with a capacity of about 16. The most logical assignment was two cabins for boys and two for girls, with one for Center 12 boys, one for Center 12 girls, etc. The small groups retained their identity within the cabins by having their own areas. Cabin assignments were the only use of this particular grouping.

3. Combinations of small groups were made for most program activities. The maximum number of students for some activities (such as archery) was limited by the amount of equipment available, safety, or other considerations. In general, since the program was based on a very active program, it was felt best to restrict the size of program groups to about 10 children, or two or three small groups. Whenever possible a boys' group was assigned with a girls' group. Grade levels were not considered. Assignments were scheduled by using these principles in matching the requests which resulted from the planning activities of each small group with available time. An alternative plan, used with great success in some other programs, is to assign a boys' group and a girls' group to the same schedule for the entire program, with the two groups sharing in planning while maintaining their separate group identities.

4. The traditional method of grouping, by class or grade, was used in this program only for programs using guest consultants where it was necessary to have two groups. The main reason for this arrangement was the assumption that it might be desirable to have students with similar academic background in the same group. This is, however, an assumption of doubtful validity, and there is actually very little need for this kind of grouping if based on educational reasons.

5. Grouping all the students in the program by sex was not used in this program.

6. For practical reasons it is most efficient to schedule certain activities, such as meals and swimming, for all the students in the program. Educational activities which consist entirely of one way transmission of information <u>to</u> the students also are most efficiently handled in one large group.

STUDENT PARTICIPATION IN PLANNING

Motivation has been defined as "finding out what the student wants, and then finding a way to satisfy his wants at the same time that he is meeting the goals of the school." Teachers know that it is always much easier to teach children what they want to know. Students know that they are often required to learn material or to participate in activities which are of absolutely no interest to them.

Camping education provides an ideal opportunity for student participation in planning, thus assuring that the student wants are considered. The particular process described here is not presented as the final word in student participation in planning, but rather as an example of a process which has been tried, has worked, and which may give other teachers and administrators a starting point from which they can develop their own planning process.

Students need not be involved in planning at the very beginning. The first step is the decision to have a school camping program. This decision involves the faculty and administration of the school, but not necessarily the students, although it should be based on reasonable certainty that the decision will be supported by parents and students. Other early decisions which can be appropriately made without student participation include the dates and duration of the program (at least tentatively), the location, and the purposes in terms of educational objectives. In the Pierce program it was decided to have a five day (one school week) program during late June or July. Several sites were considered, one staff member gathered as much information as possible about each by telephone, and at least two staff members visited the sites which seemed most attractive. The decision was made on the basis of information gathered on these visitations.

Another early planning step is the identification of staff---teachers, administrators, teacher aides, volunteers, and others---who are to work on the camping program, and the identification of the knowledge and skills of these staff members. It would be of little use to plan activities for which competent staff personnel are not available.

Early in the planning stages two of the faculty met with a representative of the Michigan Department of Natural Resources to request the assistance of specialists from that Department. Several program features which would take a total of two mornings and afternoons were offered, and were immediately scheduled for Tuesday and Thursday morning and afternoon. This left Monday afternoon, Wednesday morning and afternoon, Friday morning, and all evenings to be scheduled.

Having this information on human and physical resources, the first steps toward student participation may be taken. In the Pierce project it was decided to make the basic unit for planning a small group of five to eight

students. Each class was divided into four groups, two of boys and two of girls. The homeroom teacher assigned students to these groups on the basis of his knowledge of the students. Those who tended to be troublemakers were separated by assigning to different groups. Leadership qualities were also considered, with each group including one or more students considered to be leaders.

Each group was requested to meet, and to select one of its members to represent it in program planning, and one to represent it in menu planning. The program planning representatives met with all of the camp staff members shortly after their selection. This meeting had two objectives: to identify the resources available, and to begin to list possible program activities. The students were told about the Wells State Park, the buildings, the topography, the waterfront, and the geographical resources which the staff had identified on visits. They were also told who the staff members were, and something about their particular interests and abilities.

With this knowledge of physical and human resources, the members of this planning committee were then asked to suggest appropriate program activities. This part of the planning process was somewhat similar to "brainstorming", and was intended only to develop an extensive list of possible program components. Appropriate staff members were asked to write brief descriptions of each of the suggested activities for the information of the students. Suggested Activities for Camping Programs, on pages 12-14, is the list as presented to the students.

The next step required the student members of the planning committee to go back to their small groups, describe the planning process to date, discuss and modify the suggested activities, and develop a list of requests with priorities. It was also possible to make additions to the list at this time, although no groups did so. The form for reporting the choices and priorities is on page 15.

These selections were then compiled on one page, as shown on page 16. The most common choices were listed at the top, with less common choices listed in order below.

The planning committee then met again, and using the "Scheduling Worksheet for Small Groups", shown on page 17, began to schedule specific activities. Note that this worksheet omits Tuesday and Thursday mornings and afternoons, since these had previously been scheduled by the staff for activities with personnel of the Michigan Department of Natural Resources.

The activities selected by the greatest number of groups were scheduled first, with less popular choices filled in later. Groups were combined for activities whenever this seemed practical in terms of the educational objectives of the activity. All scheduling was done by the "wild animal" names of the groups, which had been selected earlier by each group. At nc time were class designations such as "seventh grade" or "Center 12" used, in keeping with nongraded nature of the organization. Although members of any one small group were from the same class, they were combined with other small groups without regard to whether they were from the same class.

When the scheduling was roughed out there remained some details which were settled by the staff, due to the difficulty of getting the entire planning committee together for the time required, and the inefficiencies of large groups working out final details.

Meal Planning

Each small group selected a "Food Representative" at the same time they selected a planning representative. These students gathered suggestions from their groups, and reported progress to the groups from time to time. A home economics specialist was invited to meet with the students to provide them with the basic guidelines for good meal planning, and to provide expert suggestions on the developing plans.

The tentative menu for the five days was developed in planning committee meetings with the cook and the cook's aide. It was arbitrarily decided that meals would be planned for 60 persons, a few more than were actually expected so that guests could be accommodated. The planning committee then developed a grocery list and computed the amount of each item required for the week. Representatives of the committee went to a nearby supermarket and priced each item. At this point a list, shown on pages 18-20 was prepared. It was modified only slightly by the addition or substitution of surplus food items.

The actual purchasing was done by staff, based on both convenience and cost.

Student Handbook

The student handbook, containing schedules and other information needed by students at camp, is reproduced in the green pages in the Appendix.

JOHN D. PIERCE SCHOOL
Northern Michigan University

SUGGESTED ACTIVITIES FOR CAMPING PROGRAM

July, 1969

OVERNIGHT CAMPOUT

Groups will leave the main camp area after the afternoon program and go to the Green Berets area (or other suitable location). The group will set up camp, prepare its own meal, build a campfire, plan suitable evening program, etc. In the morning the group will prepare its own breakfast, break camp, and return to the main camp.

ANIMAL TRACK IDENTIFICATION AND CASTS

The instructor will demonstrate the making of a plaster cast of an animal track, and will review means of identifying the animal from the track. Individuals will look for, identify, and make casts of tracks.

MEASUREMENT

Several methods of estimating and measuring will be demonstrated, including (1) finding heights of various objects using ratios, (2) pacing as an estimate of measurement, (3) laying out a perfect square (baseball diamond), (4) finding diameter of trees, (5) finding are of campground, acre, cabin walls or floor. Individuals will then make actual estimates and measurements using appropriate techniques.

TREE LEAF COLLECTION AND IDENTIFICATION

With the help of the instructor, collect as nearly perfect leaves as possible from a variety of trees. Press. Work out a classification system of your own according to similarities and differences. Key out specimens and learn to mount properly.

ROCK COLLECTION AND IDENTIFICATION

Collect as many different types of rock as you can find. Classify them according to observable characteristics. Make and label a rock sample kit.

SUGGESTED ACTIVITIES FOR CAMPING PROGRAM

FOSSIL COLLECTION

Collect as many types of fossils as you can find. Group them into a classification system of your own making. Make and label a fossil sample kit using the camp library as an aid.

WEATHER FORECASTING (probably to be done by all groups)

Using observations of cloud formations, temperature, wind direction, and other clues, prepare a weather prediction for the coming 24-hour period.

ASTRONOMY

(Limited to clear nights.) Identify common constellations, and find directions by using the stars.

WIDE GAMES

(Most likely an evening activity for all or most of groups in camp.) Play a team game, using a wide area of the camp as a playing "field", and emphasizing outdoor skills, planning, coordination of team members, and other skills particularly appropriate to a camp setting.

MAPPING

The instructor will demonstrate how to construct a map of a designated area, using both estimation and measurement. He will demonstrate how to determine elevations of certain locations, and differences in elevations of two locations. Determination of scale will be stressed.

ECONOMICS

The characteristics of the camp area will be examined to try to discover as much as possible about the economics of the area. How are the natural resources used and how can this utilization be improved? What are the resources?

TREE BARK COLLECTION AND IDENTIFICATION

Examine the bark on a tree (it is best to identify it while it is still on tree as you can use leaves and tree shape), collect a small sample, and label.

SUGGESTED ACTIVITIES FOR CAMPING PROGRAM

STAR CHART

In a selected area of the sky look through a piece of plastic and chart star position with wax crayon. Complete a chart by transferring this to a large sheet of paper. Use only the most visible stars of the whole sky.

DETERMINE SOIL PROFILE

Find a soil bank, clear it with a shovel, and observe the layers of soil. Sketch and color. Determine soil profile in several parts of camp site.

FISH COLLECTION AND IDENTIFICATION

Collect a variety of fish by various fishing methods. With use of hand lens, determine all you can of characteristics, such as location of eye in relation to mouth, general shape of body, number of spines in all fins, location and kind of fins, etc.

INSECT COLLECTION AND IDENTIFICATION

Collect insects and observe all the things you can, such as number of legs, body parts, general shape of body, wings, etc. Then classify them according to observed characteristics.

WILDFLOWER IDENTIFICATION (do not pick)

Locate wild flowers, observe all you can about leaves and flowers, sketch, and color.

BIRD IDENTIFICATION (do not catch or harm)

Quietly observe birds, notice characteristics, sketch and color.

ARCHERY

Learn and practice archery skills.

FISHING

SWIMMING (do not list on selection sheet---will be scheduled for all groups)

NAME OF GROUP _____

List below the choices of activities your group would like to have during the school camping program. List at least eight. When you have completed your list, put the number "1" in the space at the end of the line after the activity you want most, the number "2" after your second choice, etc.

Activity	Priority Number

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SELECTION OF ACTIVITIES FOR CAMPING PROGRAM, BY SMALL GROUPS 7-9-69
(numbers indicate priority, with first choice as "1")

	Lynx	Bobcats	Gophers	Antelopes	Tim. Wolves	Foxes	Fawns	Coyotes
Selected by all groups:								
Overnight campout	1	1	2	1	2	1	1	2
Selected by 7 groups:								
Archery	2	3	1	8	10	3	-	6
Selected by 6 groups:								
Fishing	3	2	3	10	1	2	-	1
Astronomy	5	6	4	2	4	-	5	-
Wide Game	4	5	-	5	7	-	2	4
Selected by 5 groups or 4:								
Animal track ident.	-	-	5	3	6	8	9	-
Fish collection	-	7	-	-	3	5	-	5
Rock collection	-	4	9	-	-	4	-	3
Selected by 3, 2, or 1:								
Fossil collection	-	-	10	-	-	7	-	7
Weather forecasting	-	-	-	4	-	9	4	-
Mapping	-	-	-	7	5	-	10	-
Measurement	-	-	-	9	8	-	7	-
Bird identification	7	-	6	-	-	-	6	-
Tree leaf collection	-	-	7	-	-	-	8	-
Star chart	6	-	-	-	-	-	-	-
Wild flower identificat.	-	-	-	6	-	-	3	-
Insect collection	-	-	8	-	-	-	-	-
Tree bark collection	-	-	-	-	9	-	-	-
Economics	-	-	-	-	-	6	-	-
Map reading	-	-	-	-	-	10	-	-

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Northern Michigan University

SCHEDULING WORKSHEET FOR SMALL GROUPS

		Lynx	Bobcats	Gophers	Antelopes	Timber Wolves	Foxes	Fawns	Coyotes
Monday	Afternoon								
	Evening								
Tuesday	Evening								
Wednesday	Morning								
	Afternoon								
	Evening								
Thursday	Evening								
Friday	Morning								

GROCERY LIST

JOHN D. PIERCE SCHOOL - WELLS STATE PARK

Margarine	6 pounds	4/85¢	1.29
Hamburger buns	9 dozen	35¢/doz.	3.15
Hot dog buns	18 pkgs.	29¢/pkg.	5.22
Bread	40 loaves	4/$1.00	10.00
Grated cheese	2 cans	89¢ ea.	1.78
Milk	720 half pts.	.05 3/4¢	41.40
Eggs	14 dozen	52¢/doz.	7.28
Celery	10 bunches		10.90
Carrots	8 pounds	2#/39¢	1.56
Watermelon	4 large	$1 ea.	4.00
Potatoes	40 pounds	10#/89¢	3.56
Instant potatoes	6 pounds	2#/78¢	2.34
Juice	21 cans	3/89¢	6.23
Tomato juice	6 cans	3/$1	2.00
V-8 juice	10 cans	49¢ ea.	4.90
Chicken	15 quartered	39¢/lb.	19.50
Hot dogs	12 pkgs.	2#/$1.29	7.74
Bacon	8 pounds	69¢/lb.	5.52
Corn Flakes	3 lg. boxes	41¢ ea.	1.23
Rice Krispies	3 lg. boxes	53¢ ea.	1.59
Quick Rolled Oats	1 lg. box	57¢	.57
Relish	1 pt.	43¢	.43
Sugar	15 pounds		1.90
Brown sugar	6 pounds	2#/41¢	1.23
Corn	2 - #10 cans	99¢ ea.	1.98
Catsup	5 bottles	49¢/26 oz.	2.45
Mustard	8 pounds		.99

Sweet pickles	1 jar	75¢	.75
Dill pickles	1 lg. jar	89¢	.89
Cookies	14 pkgs.	29¢/14 oz.	4.06
Peanut butter	3 pounds		1.50
Jelly	4 - 3 pound jars	35¢/18 oz.	2.80
Cake mixes (choc.)	4	29¢ ea.	1.16
Frosting (choc.)	2 cans	49¢ ea.	.98
Fruit	3 fruit cocktail 1 applesauce 2 peaches	$1.59 ea. $1.85 ea. $1.35 ea.	9.32
Potato chips	12 boxes	49¢/box	5.88
Coffee	2 - 3 pound cans	$1.80/can	3.60
Jello	8 lg. boxes	2/45¢	1.80
Wylers soft drink mix	10 pkgs.	10¢ ea.	1.00
Kool aid	12 pkgs.	6/25¢	.50
Salt	3 boxes	13¢ ea.	.39
Pepper	1 lg. can	89¢	.89
Lettuce	16 heads	29¢ ea.	4.64
Hamburger	50 pounds	69¢/pound	34.50
Cabbage	6 pounds	14¢/pound	.84
Green beans	3 - #10 cans	$1.09	3.27
Tomatoes	1 dozen	35¢/pound	1.35
Tomato paste	6#15 oz. can	$1.99	1.99
Maple flavoring	1 jar	25¢	.25
Cold cuts	4 pounds	69¢/pound	2.76
Chili powder	1 lg. can	48¢	.48
Kidney beans	2 - #10 cans	99¢ ea.	1.98
Chocolate pudding	10 lg. pkgs.	2/35¢	1.75
Soda crackers	2 pound box	50¢	.50
Miracle Whip salad dressing	1 quart	55¢	.55
Vinegar	1 pint	17¢	.17

Bacon bits	4 pounds	$1.59	1.59
Pancake mix	10 pounds	2#/39¢	1.95
Chicken bouillion	1 sm. jar	25¢	.25
Italian seasoning	1 sm. jar	39¢	.39
French dressing	2 lg. jars	53¢ ea.	1.06
Cucumbers	4 large	10¢ ea.	.40
Ice cream	2 - 3 gallon tubs	$4.05 ea.	8.10
Popcorn	1 lg. bag	2#/33¢	.33
Cones	5 dozen	4 doz./59¢	.75
Nestles Quick	2 pounds	89¢	.89
Onions	9 pounds	3#/39¢	1.17
Ham	8 pounds	79¢/lb.	6.32
Spaghetti	5 - 3# boxes	75¢/box	3.75
Hershey bars	120 bars	6 for 25¢	5.00
Napkins		Donated	
Paper cups	1 pkg.	50 for 53¢	.53
Paper plates	2 pkgs.	150/79¢	1.58
Dish soap	1 bottle	81¢	.81
Aluminum foil	1 box	45¢	.45
Glad wrap	1 box	75¢	.75
Kleenex	12 boxes	18¢ ea.	2.16
Wooden matches	3 boxes	31¢	.31
TOTAL			$279.83

EVALUATION

Anything worth doing is worth a sound evaluation. Not only will this process assist the faculty in determining the effectiveness of the program in meeting their goals, but it will also help the students to review the program and, in the process, to gain some additional understanding.

The evaluation of the 1969 Pierce program was done through both oral and written techniques. The students met on the first school day after their return to discuss their experience and to fill out a five page written evaluation form. In addition, staff members provided considerable evaluation, including some in written form. The processes used here were relatively simple, and could be easily adopted by others.

Oral Evaluation

The camp director led the discussion session in which the program was discussed. Notes were taken by a teacher aide. These notes show that the students considered cabins, dining facilities, and food good. They also approved of the program. They considered the swimming facilities "adequate."[1] The overnight campout was considered "most fun of all." The canoe and water safety program was very well liked, but it was suggested that more time should be provided for it. More time was also suggested for archery.

Students on kitchen duty liked the idea of having their work shift for three consecutive meals, but it was felt that the group on the overnight campout should not be scheduled for kitcher duty immediately on their return. It was also pointed out that kitchen duty reduced free time (although there were no plans presented for improving this). About half of the students felt that they should not have been required to sit with their own small groups in the dining hall.

They indicated that they would like to go again if they had the chance. No safety problems were identified, and no behavior problems except that students were "impolite about listening to others."

Written Evaluation

The written evaluation form, with the numbers of responses written in, is reproduced following this analysis. There are fewer evaluations than there were

---

[1]The bottom was covered close to shore with medium size rocks which made walking on the bottom very difficult. This area was selected for convenience, since the nearest area with a smooth bottom was a considerable distance from the camp.

students in camp due to the absence of some students when the evaluation forms were filled out.

Items 1 and 2 asked for Center and sex of the respondent.

Item 3, intended to identify the relative value of the various activities as seen by the campers, did provide some useful information.

1. ALL campers indicated that swimming and the overnight campout would be wanted if they were going again.

2. Girls generally preferred the canoe safety, slides of U.P. scenery, wild flower identification, economics, tree bark identification, and bird identification more than boys did.

3. The boys preferred fishing, fire prevention, and fish identification more than the girls did.

4. The items most suggested for omission in future programs includes the slides of U.P. scenery, rock and fossil identification, and wild flower identification. In each case, however, there were more students who would retain these activities than there were that would drop them.

Item 4, to provide data on meals, length of program, facilities, and staffing, also provided some useful information.

1. Students felt strongly that the food was good and plentiful, and that the facilities for the overnight campout were adequate. About two thirds thought that cooking should be included in the overnight campout.

2. The majority seemed to feel that staff members were neither too strict nor too lenient. The logical conclusion is that the students felt that supervision was about right.

3. The length of the program seemed to meet the approval of most students, with 27 of 31 stating that five days is not too long, about half feeling that five days is too short, and just under half that five days is just right. Boys were somewhat more inclined to prefer a longer program than were girls.

4. About two thirds felt that there was enough student involvement in planning, and that the students understood their planning role.

5. Most of the students (about two thirds) indicated that there was sufficient reference material and equipment. Only about half of the students indicated that they used the reference pages in their camp booklets.

Item 5 requested students to list as many things they learned in camp as they could. In order by number of responses, these were their learnings. The number of students indicating this item is given in parenthesis. Similar responses have been combined into a single item.

Archery (15), especially Center 12

Boat and canoe safety (14)

Animals (tracks; game management) (13), especially girls

Mapping (12), especially Center 13

Living with friends; getting along with people (10), especially girls
Living with teachers (4), all Center 12

Forest management, tree bark (9), especially Center 12 girls
Fire prevention (9)

Weather forecasting (8), especially girls

Fish (7), especially girls
Flowers (7), especially girls

Need for insect repellant (4), all girls
Insects (4)
Dish washing (4)
Economics (4)
Capture the flag (4), especially girls

Fossils and rocks (3)
Keeping cabins clean and caring for belongings (3), all Center 12 girls
Menominee County and surrounding area (3)
Firearms (3)
How to take good pictures (3), all Center 13 girls

Water (Lake Michigan or Green Bay) (2)
What to take on a camping trip (2), both girls
Dance (2), both boys

Also mentioned, by one student each, were land, play blackjack, how beautiful U.P. can be, songs, not to run into water just after playing a game, "if I really try to work something out, I'll make it", how to live in the woods without TV, to swim in melted ice, birds, how to beat (avoid) camera, how to get out of cabin at 10:30, how to lay out a baseball diamond, and care for self (eat good meals, avoid wood ticks). Three students did not respond to this item.

Item 6 was open ended, permitting students to write whatever they wanted about the camp. Their responses follow:

Center 12 boys:

1. "I think it was too tightly scheduled."

2. "The bell. I would remove the bell if it is still there and throw it in the lake."

3. "I don't think we should have a bell because it's annoying when you get up."

4. "It was a well planned campout."

5. "It wasn't a bad camping trip. A few things should be improved, like rest periods, should be more free time and wide games. The overnight was fun but have two instead of one."

6. "More overnights and no work."

Center 12 girls:

1. "I think that we had just enough free time while we were at camp. We were running out of things to do with our free time. I liked the idea of cabins for each center. If both the Center 12 and 13 girls had been in one cabin, it probably would have turned into a slumber party. I also think that it may have been better to schedule the activities differently, not always with the same people together in their groups."

2. "I enjoyed camp very much. I learned a lot at camp. It would be fun to go on another campout like that. I liked the games we played. Camp was a blast."

3. "I thought camp was very fun, and it was a great opportunity. I learned a lot, and had fun at the same time. I learned, as I said before, the true meaning of camp."

4. "The camp was very fun and I sure enjoyed it. In future camping trips I don't think they should change much (except maybe the bugs). The camp was fun and I think everyone should go."

5. "I liked the camp very much. If we did it again I would not change anything except maybe let the pupils cook at least one meal in the kitchen. We could also have cooked on our overnight. Other than that I would not change anything."

6. "Camp was really a nice place. You learned more about outdoors. How to do more things, identyfying trees, bugs, flowers, birds, etc. On the overnight you did things for your group---building the fire, chopping the wood, and things like that."

7. "I think the camp was very interesting and I learned a lot. It would help other kids in such things as archery and mapping. Then there's the lessons all about forestry. I hope that all kids will get the chance I got cuz I loved it."

8. "I think you should have archery and canoe safety which helps in future years. We should have stuff about the forest and have an overnight campout."

9. "I think that you should plan more free time. I like camp but wish I could go again."

Center 13 boys:

1. "I would go to the same camp if I had the chance, but would like to have stayed up later and have a little more free time. It was interesting having the conservation officer come in and talk to us and I think that was really good."

Center 13 girls:

1. "I think that we should have had more free time, and not <u>always</u> have to be with our buddies and groups."

2. "More free time. More free TV. More good desserts. More snacks. Less orderliness. Less buddies all the time."

3. "I think there should have been more free time. More wide games. Everything there was fine and fun."

4. "A camp shouldn't be much better than this one. They should find something better to use to keep the bugs (mosquitos especially) away. There should be more free time."

5. "Next time I wish there wasn't so many classes. The weather forecasting wasn't bad but every night we were too busy doing other things, like the dishes."

6. "Don't change it!"

JOHN D. PIERCE SCHOOL
Northern Michigan University
Marquette, Michigan 49855

EVALUATION OF 1969 SCHOOL CAMPING PROGRAM

To help in planning future school camp programs, and in advising other schools on their school camps, we need your honest reactions to the camp program you participated in. Please read and follow directions carefully, and be honest!

1. Check one:
   - 17 Center 12
   - 14 Center 13

2. Check one:
   - 13 Boy
   - 18 Girl

Center 12
- 7 Boys
- 10 Girls

TOTAL 17

Center 13
- 6 Boys
- 8 Girls

TOTAL 14

TOTAL 31

3. Check one box after each item.

		If I were going to a school camp again,			
	I did not take part in this	I would not want this	I don't care whether this is scheduled	I would want this	Not usable
a. Archery	4		1	26	
b. Swimming				31	
c. Capture the Flag			6	25	
d. Weather forecasting	3	5	19	4	
e. Game management		5	15	11	
f. Forest management		4	13	14	
g. Fish management & pesticides		3	7	20	1
h. Overnight campout				31	
i. Fishing	7	2	6	16	
j. Firearms safety & law	2	3	15	11	
k. Canoe safety	1	1	7	21	1
l. Fire prevention	1	2	15	11	2
m. Fire equipment demonstration	1	1	11	17	1
n. Slides of U.P. scenery	2	7	8	13	1
o. Mapping	8	3	7	10	3
p. Rock & fossil identification	11	7	5	8	1
q. Animal track casting	2	3	10	16	
r. Wild flower identification	8	6	10	7	
s. Fish identification	14	2	6	8	1
t. Measurement	16	5	6	2	2
u. Insect collection	18	3	8	0	2
v. Economics	17	1	1	8	4
w. Tree bark identification	17	4	6	2	2
x. Bird identification	18	3	4	4	2
y. Dance	3	0	1	27	

4. Check <u>one</u> box after <u>each</u> item.

	Yes	Don't know or undecided	No	Not Usable
a. There was enough food at meals.	30	1		
b. The food was good.	27	3	1	
c. We were kept too busy.	14	5	12	
d. Our cabins were comfortable.	26	3	1	1
e. Staff members were too strict in their supervision.	5	8	18	
f. Staff members were not strict enough in their supervision.	5	6	20	
g. I used the material in the back of the schedule booklet on weather, identification on rocks, minerals, trees.	11	7	10	3
h. Five day camp is too long.	2	2	27	
i. Five day camp is too short.	17	3	11	
j. Five day camp is just right.	9	6	15	1
k. There should have been daily evaluation meetings.	7	4	20	
l. Was sufficient reference material available?	21	7	2	1
m. Was enough equipment supplied?	20	3	7	1
n. Was there enough student planning?	19	7	5	
o. Did students understand their role in planning?	23	8		
p. Were overnight activities adequate?	29	1		1
q. Should cooking be included on overnights?	17	6	8	

5. List below as many things you learned in camp as you can think of. (You may include incidental learnings, such as "how to get along with people better", as well as factual and skill learnings.)

6. Write a paragraph below telling anything you want about the camp, especially those things which you think would help Pierce or other schools in planning similar programs in the future.

BIBLIOGRAPHY

CAMPING EDUCATION DOCUMENTS AVAILABLE FROM ERIC

The Educational Research Information Center (ERIC) is a system for making available information on research and projects related to education. Abstracts of ERIC listings may be found in Research in Education, a monthly compilation available in many libraries or by subscription from the Superintendent of Documents, U.S. Government Printing Office. EDRS, the ERIC Document Reproduction Service, can reproduce the complete text of most documents listed here in two ways: in MF---microfische, a 4" x 6" filmcard displaying approximately sixty micro-image pages of text---25¢ each, or in HC---hard copy, a photographically reproduced paperback booklet approximately 70 percent the size of the original document---at 5¢ per page. The notation "EDRS Price: MF-$0.25 HC-$1.50" means that the document is available from EDRS in microfische for 25¢ or in hard copy for $1.50. Order from Eric Document Reproduction Service, 4936 Fairmont Avenue, Bethesda, Md. 20014, and include document number and a 50¢ service charge for each order to cover postage and handling.

Ambry, Edward Joseph. An Investigation of the Administrative Problems Related to the Resident Outdoor Education Programs in Certain Public Elementary and Secondary Schools. (ED 021 683: Not available from EDRS: order from University Microfilms, 300 Zeeb Road, Ann Arbor, Michigan 48106, by order number 65-1317.)

American Association for Health, Physical Education and Recreation. Education in and for the Outdoors; Report of the National Conference on Outdoor Education, May 2-4, 1962. (ED 023 516: Not available from EDRS: order from American Association for Health, Physical Education, and Recreation, 1201 16th Street, N.W., Washington, D. C. 20036. Cost $2.00.)

Busch, Phyllis S. A New Approach to School Camping, Grades K-6, Some Suggestions for Outdoor Investigations in Science-Conservation for Camps, Parks, Playground, and Sanctuaries. (ED 034 675: EDRS Price: MF-$0.25 HC-$2.30.)

Department of the Interior, Bureau of Outdoor Recreation. Index to Selected Outdoor Recreation Literature, Volume I. (ED 022 592: EDRS Price: MF-$0.75 HC-Not available, order from Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.)

Department of the Interior, Bureau of Outdoor Recreation. Index to Selected Outdoor Recreation Literature, Volume II. (ED 022 593: EDRS Price: MF-$1.00, HC-Not available, order from Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.)

Gilfillan, Warren C. and Roberta Burgess. The Teachers' Handbook for the Outdoor School. (ED 018 383: EDRS Price: MF-$0.25 HC-$1.68.)

Hammerman, Donald R. and William M. Hammerman. Teaching in the Outdoors. (ED 020 828: Not available from EDRS: Order from Burgess Publishing Company, 426 South 6th Street, Minneapolis, Minnesota 55440.)

Hug, John and Phyllis J. Wilson. Curriculum Enrichment Outdoors. (ED 020 850: Not available from EDRS: order from Harper and Row, Publishers, Evanston, Illinois 60204.)

Isenberg, Robert. Outdoor Education - A Method of Teaching. (ED 011 807: EDRS Price: MF-$0.09 HC-$0.32.)

Jefferson County Public Schools (Lakewood, Colorado). Outdoor Education Curriculum, Guide, Grade 6. (ED 024 484: EDRS Price: MF-$0.75 HC-$9.50.)

Mand, Charles L. Outdoor Education. (ED 034 648: Not available from EDRS: order from J. Lowell Pratt and Company, Inc., 15 East 48th Street, New York, New York 10017.)

Nolan, Hugh B. Outdoor Education Action Model. (ED 022 605: EDRS Price: MF-$0.25, HC-$0.64.)

Palmer, N. J. Outdoor Education Project Report, Camp Alpine. (ED 030 529: EDRS Price: MF-$0.50 HC-$5.90.)

Ryan, Arthur J. Teacher's Guide to Outdoor Education. (ED 020 129: EDRS Price: MF-$0.50 HC-$4.60.)

Shoman, Joseph. Manual of Outdoor Conservation Education. (ED 016 606: Not available from EDRS: order from National Audubon Society, Nature Centers Division, 1130 Fifth Avenue, New York, New York 10028.)

Smith, Julian W. Outdoor Education: An Overview. (ED 034 631: EDRS Price: MF-$0.25 HC-$0.50.)

Smith, Julian W. Outdoor Education, The Classroom Teacher Series in Health Education. (ED 022 600: Not available from EDRS: order from NEA Publications Sales, 1201 Sixteenth Street, N.W., Washington, D. C. 20036. Cost $0.75.)

Smith, Julian W. "Program Facilities and Leadership for Outdoor Education." Bulletin of the National Association of Secondary School Principals, Vol. 44, No. 256, pp. 159-65, May, 1960. (ED 023 491.)

Smith, Julian W. "The Scope of Outdoor Education." Bulletin of the National Association of Secondary School Principals, Vol. 44, No. 256, pp. 157-9, May, 1960. (ED 023 490.)

van der Smissen, Betty and Oswald H. Goering. A Leader's Guide to Nature-Oriented Activities. (ED 023 513: Not available from EDRS: order from Iowa State University Press, Ames, Iowa 50010. Cost $2.95.)

Wykoff, Jack N. and others. A Camping We Will Go. (ED 017 348: EDRS Price: MF-$0.50 HC-$3.20.)

OTHER USEFUL DOCUMENTS

The following are other useful sources of information on camping education and outdoor education.

Carvajal, Joan and Martha E. Munzer. Conservation Education: A Selected Bibliography. Danville, Ill.: The Interstate Printers and Publishers, Inc., 1968. An annotated list of publications for students and teachers on conservation.

Freeberg, William H. and Loren E. Taylor. Philosophy of Outdoor Education. Minneapolis: Burgess Publishing Company, 1961. 445 pp.

Programs in Outdoor Education. Minneapolis: Burgess Publishing Company, 1963. 457 pp. Discusses various types of outdoor education (school journeys, gardening, farms, forests, camps, etc.) and relates outdoor education to each major curriculum area (social studies, mathematics, etc.).

Hammerman, Donald R. and William M. Hammerman. Outdoor Education: A Book of Readings. Minneapolis: Burgess Publishing Company, 1968. 401 pp. Sections on philosophy, history, curriculum objectives and methods, teacher education, and evaluation and research.

Hammerman, Donald R. and William M. Hammerman. Teaching in the Outdoors. Minneapolis: Burgess Publishing Company, 1964. 120 pp. Extending curricula to the out-of-doors, techniques for teaching, and implications for teacher education.

Michigan Department of Conservation. Conservation Education for Elementary Grades. Lansing, Mich.: Michigan Department of Conservation.

Michigan Department of Conservation. Conservation Education for Intermediate Grades. Lansing, Mich.: Michigan Department of Conservation, 1964.

Michigan Department of Conservation. Conservation Education for Junior High Grades. Lansing, Mich.: Michigan Department of Conservation, 1964. Specific suggestions for conservation activities, many useful in camp.

New York State Education Department. Pathways to Better Education. Albany, N.Y.: University of the State of New York, State Education Department, Bureau of Elementary Curriculum Department. A brief description of outdoor education, including some specific guidelines for building a quality program.

Schramm, Wilbur. Classroom Out-of-Doors. Kalamazoo, Mich.: Sequoia Press, 1969. A description of the school camp program of San Diego. Excerpts from this book appeared in the April and May, 1969, issues of the National Elementary Principal magazine.

Sharp, L. B. and E. DeAlton. Camping and Outdoor Education. Issue of Bulletin of the National Association of Secondary School Principals. Volume 31, May, 1947. A periodical issue with articles by some of the outstanding experts in this field.

Smith, Julian W. and Jane Ann Waldron. Outdoor Education. A newsletter for the exchange of ideas on outdoor education, published periodically by the Outdoor Education Project, American Association of Health, Physical Education and Recreation, College of Education, Michigan State University, East Lansing, Michigan 48823.

U.S. Department of Agriculture. Teaching Conservation Through Outdoor Education Areas. Washington, D.C.: U.S. Government Printing Office, July, 1968. This 23 page brochure, available from the Superintendent of Documents for 20¢, covers the aims of conservation education, the choice and development of an outdoor education area, and examples of the use of such areas.

APPENDIX A

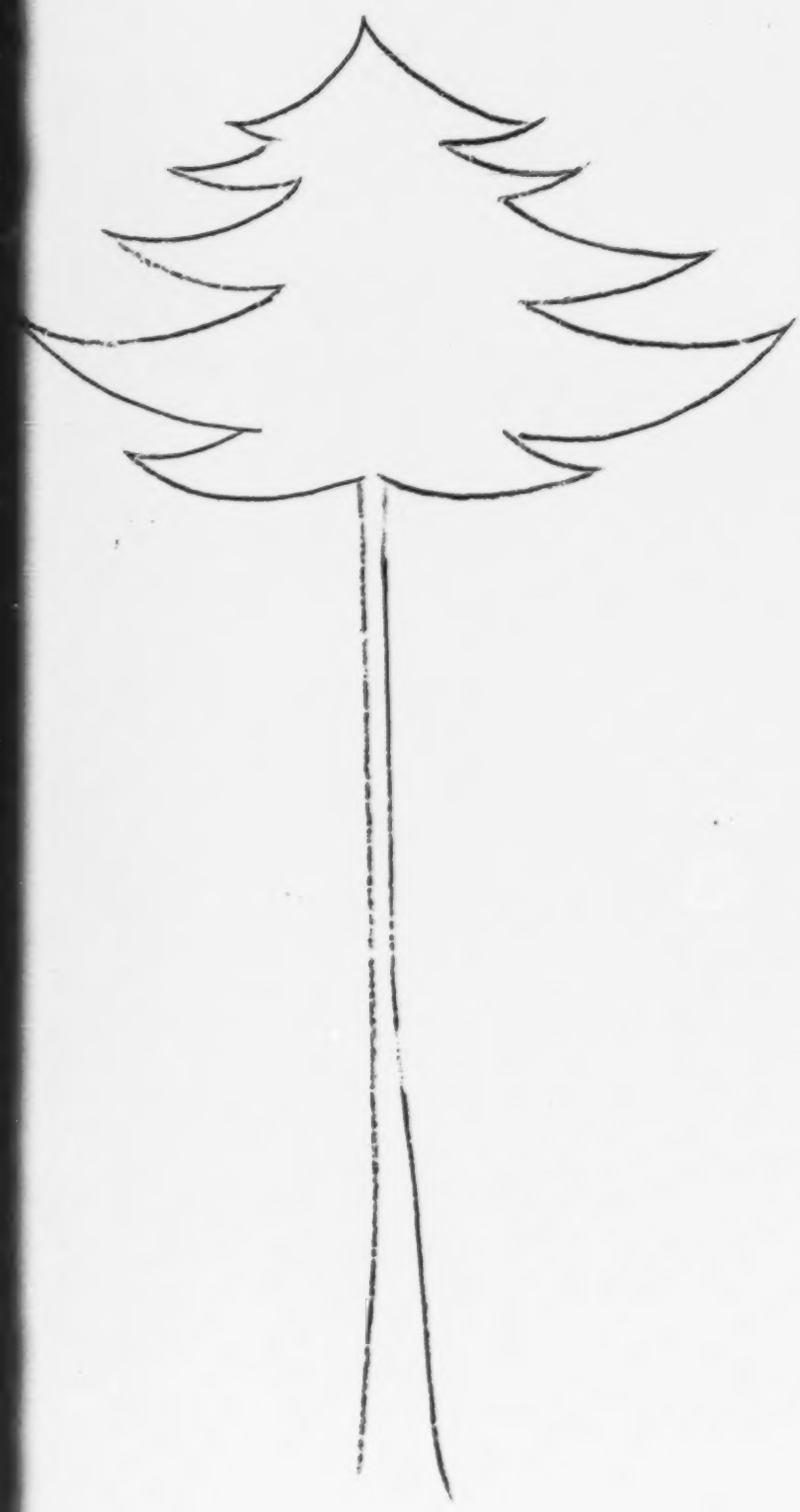
FINANCIAL DETAILS OF 1969 PIERCE CAMP PROGRAM

(The following information on the 1969 John D. Pierce School camping program is included to give some idea of the financial aspects of the program. This will, obviously, vary in other schools depending on local situations.)

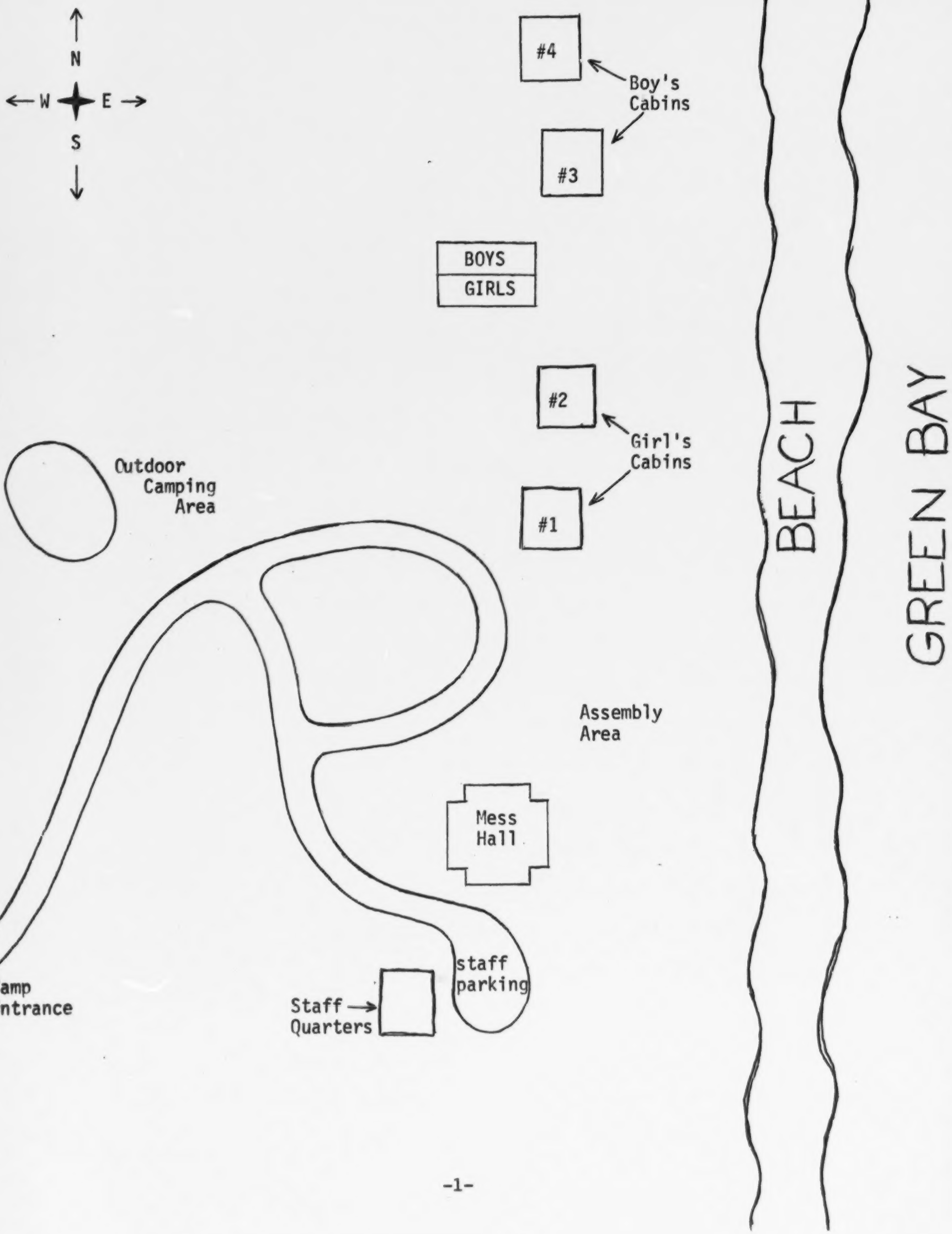
Expenditures:	Food	$236.34
	Fee for use of state park facilities	100.60
	Cost of bus	207.50
	Staff transportation	43.20
	Camp accident insurance	29.40
	Miscellaneous supplies	24.96
		$642.00
Income:	Fees (33 students at $15 each)	$495.00
	Donation	5.00
	Staff fees for meals	108.00
	School budget	34.00
		$642.00

The student fee was intended to cover the cost of food, transportation, insurance and other consumable items. Staff members paid for their meals. Staff were not paid additional salary for participation in this project, but were reimbursed for out-of-pocket expenses.

The insurance purchased by students was a standard "Organization-Church Camp Policy", which cost 60¢ per person and covered both students and staff. It provides for cost of medical care, and death and dismemberment benefits. It is possible to get similar insurance with varying coverage for slightly lower or higher premiums. Insurance agents have complete details.



JOHN D. PIERCE SCHOOL
OUTDOOR EDUCATION CAMP
WELLS STATE PARK
1969


N
W
E
S
#4
Boy's Cabins
#3
BOYS
GIRLS
#2
Girl's Cabins
#1
Outdoor Camping Area
Assembly Area
Mess Hall
staff parking
Staff Quarters
Camp Entrance
BEACH
GREEN BAY

RECOMMENDED CLOTHING & EQUIPMENT FOR CAMPING TRIP

1. Sleeping bag or a well made bedroll
2. Pillow
3. Towels (5)
4. Washcloth (1)
5. Toothbrush and toothpaste
6. Plastic cup or glass
7. Underwear (5 days)
8. Socks (6 pair)
9. Long pants (3 pair)
10. Shorts (3 pair)
11. Blouses or shirts (5)
12. Sweater or sweatshirt
13. Warm jacket
14. Waterproof jacket or coat or slicker
15. Tennis shoes, boots (at least 3 pair in all)
16. Bathing suit & 2 bath towels
17. Notebook & 2 pencils or a pen
18. Mosquito dope
19. Soap
20. Hat or scarf
21. Comb and/or hair brush
22. Ground cover

THE FOLLOWING ITEMS ARE OPTIONAL

23. Jacknife
24. Camera
25. Bathing cap
26. Gloves
27. Pajamas
28. Canteen
29. Sun glasses
30. Flash light

STUDENTS ATTENDING SUMMER CAMPING PROGRAM
July 14 - 18, 1969

CENTER 12	CENTER 13
Bennetts, Susan	Argetsinger, Thomas
Bohjanen, Sandra	Beck, Kathleen
Bush, John	Berglund, Jane
Carefoot, Barbara	Buckman, Lorraine
Carnahan, Elizabeth	Bush, Daniel
DeFant, Daniel	Caviani, Christine
Gummerson Peter	DeFant, David
Kumpula Edward	deRoche, Abby
LaBonte, Mary	Johnson, Janyth
Moratti, Julie	Lantto, Mark
Mudge, Mark	Lyons, Thomas
Murray, Laurie	Matthews, Linda
Ohman, Janet	Ohman, Nancy
Peterson, Jill	Roberts, Patricia
Rapport, Adele	Wagner, James
Schwitzgoebel, Clare	
Specker, Jack	
Wagner, Michael	

CAMP PERSONNEL

Dr. Thomas Q. Culhane	Principal
Mr. Lawrence Nobert	Camp Director - Social Studies
Mr. Howard Buchanan	Assistant Director Science
Mrs. Helen Pangrazzi	Recreation Director & First Aid
Mr. Jerome Chuman	Social Studies
Mr. Thomas Dickens	Social Studies
Mr. Matthew Rodman	Science
Mr. Howard Makela	Science
Mr. Gerald Sundquist	Math
Mr. Lester Gray	Math
Mrs. Howard Buchanan	Kitchen
Mrs. Rhonda LeMerise	Kitchen

RESOURCE PERSONNEL
(Department of Natural Resources)

Mr. Ivan Thompson	Habitat Biologist
Mr. Paul Pierce	Forester
Mr. Dick Schorfharr	Fish Biologist
Mr. John Wormwood	Conservation Officer
Mr. Natale Coppo	Conservation Officer
Mr. David Peterson	Conservation Officer
Mr. Grover Wemple	Fire Officer
Mr. Charles Palo	Fire Officer

JOHN D. PIERCE SCHOOL
OUTDOOR EDUCATION CAMP
WELLS STATE PARK

GROUPS

TIMBER WOLVES
13 boys A

Jim Wagner
Tom Lyons

FOXES
13 boys B

Dave DeFant
Dan Bush
Tom Argetsinger
Mark Lantto

ANTELOPES
13 girls A

Christine Caviani
Nancy Ohman
Abby deRoche
Janyth Johnson
Linda Matthews

FAWNS
13 girls B

Lorraine Buckman
Jane Berglund
Kathy Beck
Patricia Roberts

COYOTES
12 boys A

John Bush
Jack Specker
Pete Gummerson

BOB CATS
12 boys B

Mike Wagner
Dan DeFant
Edward Kumpala
Mark Mudge

LYNX
12 girls A

Sue Bennett
Julie Moratti
Ann Carefoot
Janet Ohman
Adele Rapport

GOPHERS
12 girls B

Elizabeth Carnahan
Clare Schwitzgoebel
Sandy Bohjanen
Mary LaBonte
Laurie Murray
Jill Peterson

CABIN COUNSELORS

These staff personnel are responsible for the students while in the cabins.

CABIN	GROUPS	COUNSELOR
Girl's Cabin #1	Lynx & Gophers	Mrs. LeMerise
Girl's Cabin #2	Antelopes & Fawns	Mrs. Pangrazzi
Boy's Cabin #3	Coyotes & Bob Cats	Mr. Makela, Mr. Sundquist
Boy's Cabin #4	Wolves & Foxes	Mr. Chuman, Mr. Dickens

GROUP ADVISORS

These staff personnel are responsible for the students at all other times

GROUP	ADVISOR
Timber Wolves	Mr. Schuman
Foxes	Mr. Dickens
Antelopes	Mrs. Pangrazzi
Fawns	Mr. Gray
Coyotes	Mr. Makela
Bob Cats	Mr. Sundquist
Lynx	Mrs. LeMerise
Gophers	Dr. Culhane

PROCEDURES

1. The waterfront area is "OFF LIMITS" TO ALL CAMPERS UNLESS IT IS SUPERVISED. NO ONE may enter the water for any reason, unless the supervisor is present.

2. Campers must do their best in adhering to the time schedule set up. We have many activities planned and promptness on the camper's part is important.

3. "LIGHTS OUT" time will be 10:00 P.M. Campers are expected to be in bed and ready for sleep at that time. All errands should be done before that time.

4. If a camper should somehow stray away from his or her group, please remember to STOP the minute you realize you're turned around. Don't go crashing through the woods looking for someone; we'll look for you, and the easiest way for us to find you is for you to stay in one place.

5. Please, please, please!! do not bring food to camp. We will have lots of good meals and snacks for you. The mice love to eat cookies and other sweet things and we'd rather the animals stay outside.

6. No one will leave the camp area without getting permission from the camp director.

7. ALL injuries must be reported to the staff member in charge of the group the student belongs to.

8. Rest period rules:
   All rest periods will be held in cabins.
   Students must stay on bunks (feet cannot touch the floor).
   Students must remain reasonably quiet.

FIRST AID FOR CAMPERS

WOUNDS (break in skin)
Stop bleeding by direct pressure if necessary, preferably with clean dressing.
Keep clean by washing and covering with band-aid or other dressing.

SPRAINS and injuries to muscles and joints
DO NOT MOVE if fracture is suspected.
Apply cold for 30 minutes immediately after injury.

BRUISES
Apply cold for 30 minutes immediately after injury.

STINGS
Apply cold. Remove stinger if present.

POISON IVY
Wash thoroughly with strong soap immediately after contact. Do not scratch or otherwise break blisters. (This may cause spreading.)

WOOD TICKS
Immediately notify a staff member who will remove the tick.

BURNS
Use cold water to relieve pain.
Use burn ointment ONLY for sunburn or minor burns: otherwise treat as a wound.

ANY ACCIDENT OR INJURY
Notify a staff member. (Preferably the one in charge of your group.)

YOU WON'T NEED ANY OF THIS INFORMATION IF YOU:

1. Get plenty of rest - tired campers are accident and illness risks.

2. Use tools correctly and keep them in good condition.

3. Use common sense. Look for and avoid hazards.

CAMP DUTIES

In every group camp some kinds of duties are important in order to protect your health and welfare as well as that of others.

Restrooms

1. Pick up paper and other debris.
2. Leave washbowls clean.
3. Flush toilets.
4. Sweep floor and keep it clean.
5. Keep towels neatly hung after use.
6. Keep shelves and lockers neat.

Sleeping Quarters

1. Sweep floor and keep it clean.
2. Pick up paper and debris.
3. Make beds.
4. Put clothes away properly.
5. Store luggage appropriately.

Dining Hall and Kitchen

1. Sweep floor and keep it clean.
2. Wash floor (if necessary).
3. Clean dining tables with antiseptic.
4. Rinse dishes and utensils with antiseptic, unless water at temperature of 160 degrees.
5. Arrange chairs and tables in an orderly manner.
6. Work to satisfaction of kitchen mother.

Grounds

1. Keep paper picked up.
2. Store and protect equipment properly.
3. Protect all equipment and plants in park area.

Luggage

1. Keep clothing packed and stored neatly while at camp.
2. Pack clothing carefully when leaving camp.
3. Keep dirty clothes separate.

KITCHEN - DINING ROOM DUTIES

Monday, Tuesday	supper, breakfast, lunch	Lynx	Wolves
Tuesday, Wednesday	supper, breakfast, lunch	Antelopes	Coyotes
Wednesday, Thursday	supper, breakfast, lunch	Gophers	Foxes
Thursday, Friday	supper, breakfast, lunch	Fawns	Bob Cats

REST ROOM DUTIES

BOYS	DAY	GIRLS
Bob Cats	Tuesday	Fawns
Wolves	Wednesday	Lynx
Coyotes	Thursday	Antelopes
Foxes	Friday	Gophers

Each group is responsible for cleaning the grounds in their own cabin area.
All groups are responsible for assembly area. Let's keep our camp clean!
Each cabin will be responsible for helping keep their cabin neat and clean.
Cabin counselors will check their own cabins.
"Kitchen Crew" will report to kitchen one half hour before each meal.

FLAG RAISING & LOWERING DUTIES

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Raising	Lynx	Antelopes	Coyotes	Timber Wolves	OPEN
Lowering	Gophers	Fawns	Bob Cats	Foxes	

CAMP MENU
John D. Pierce School - Wells State Park

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
BREAKFAST	AT HOME	SCRAMBLED EGGS BACON TOAST & JELLY JUICE MILK	PANCAKES FRIED SPAM BUTTER & SYRUP JELLY JUICE MILK	DRY CEREAL COOKED CEREAL FRUIT TOAST & JELLY JUICE MILK	FRENCH TOAST BACON BUTTER & SYRUP JELLY JUICE MILK
LUNCH	BAG LUNCH	HAMBURGERS CHEESEBURGERS BUNS CATSUP & MUSTARD POTATO CHIPS CARROT & CELERY STICKS MILK FRUIT	HAM & SCALLOPED POTATOES COLESLAW BREAD & BUTTER MILK ICE CREAM	CHILI CHEESE & CRACKERS BREAD & BUTTER MILK CHOCOLATE PUDDING	SMORGASBORD
DINNER	SPAGHETTI & CHEESE TOSSED SALAD BREAD & BUTTER MILK ICE CREAM	CHICKEN MASHED POTATOES GRAVY CORN JELLO SALAD BREAD & BUTTER CARROT & CELERY STICKS MILK COOKIES	<u>COOKOUT</u> HOT DOGS BAKED BEANS POTATO CHIPS CARROT & CELERY STICKS CATSUP & MUSTARD PICKLES & RELISH MILK WATERMELLON MARSHMALLOWS	MEAT LOAF BAKED POTATOES GREEN BEANS TOSSED SALAD BREAD & BUTTER MILK JELLO COOKIES	AT HOME

MONDAY

11:30	Get Settled	
12:00	Flag Raising	
	Lunch	
	Rest	
1:30	Timber Wolves	Mapping
	Foxes	Rocks & Fossils
	Antelopes	Animal Track Identification
	Fawns	Mapping
	Coyotes	Animal Track Identification
	Bob Cats	Animal Track Identification
	Lynx	Archery
	Gophers	Rocks & Fossils
2:45	Timber Wolves	Mapping
	Foxes	Animal Track Identification
	Antelopes	Wild Flower Identification
	Fawns	Mapping
	Coyotes	Archery
	Bob Cats	Archery
	Lynx	Wild Flower Identification
	Gophers	Animal Track Identification
4:00	Swim	
5:30	Dinner	
	Rest	
6:45	Wide Game	
8:30	Flag Down	
	Orientation to Park	
9:30	Snack Time	
	Prepare for bed	
10:00	Lights Out	

TUESDAY

7:00	Rise & shine Wash & dress	
7:30	Flag Raising Breakfast	
8:15	Make beds, clean cabins Inspection of cabins	
9:00	Timber Wolves Foxes Antelopes Fawns	Game Management
	Coyotes Bob Cats Lynx Gophers	Forest Management
10:30	Timber Wolves Foxes Antelopes Fawns	Forest Management
	Coyotes Bob Cats Lynx Gophers	Game Management
11:45	Free	
12:00	Lunch Rest	
1:30	Fish Management & Pesticides	
4:00	Swim	
5:30	Dinner Rest	
7:00	Timber Wolves, Antelopes, Bob Cats & Lynx depart for overnight Fishing for remaining groups	
9:30	Flag Down Snack time Prepare for bed	
10:00	Lights Out	

WEDNESDAY

7:00	Rise & shine Wash & dress	
7:30	Flag Raising Breakfast	
8:15	Make beds, clean cabins Cabin Inspection	
8:20	Apollo 11 Launching	
9:20	Timber Wolves	Fish Collection
	Foxes	Fish Collection
	Antelopes	Measurement
	Fawns	Wild Flower Identification
	Coyotes	Rocks & Fossils
	Bob Cats	Rocks & Fossils
	Lynx	Animal Track Identification
	Gophers	Insect Collection & Identification
10:40	Timber Wolves	Fish Collection
	Foxes	Fish Collection
	Antelopes	Measurement
	Fawns	Animal Track Identification
	Coyotes	Archery
	Bob Cats	Archery
	Lynx	Animal Track Identification
	Gophers	Insect Collection & Identification
11:45	Free	
12:00	Lunch Rest	
1:30	Timber Wolves	Measurement
	Foxes	Economics
	Antelopes	Archery
	Fawns	Measurement
	Coyotes	Mapping
	Bob Cats	Insect Collection & Identification
	Lynx	Economics
	Gophers	Tree Bark Collection
2:45	Timber Wolves	Measurement
	Foxes	Archery
	Antelopes	Free
	Fawns	Measurement
	Coyotes	Mapping
	Bob Cats	Wild Flower Identification
	Lynx	Archery
	Gophers	Wild Flower Identification
4:00	Swim	

WEDNESDAY (continued)

5:30 Dinner
Rest

7:00 Coyotes, Gophers, Foxes & Fawns depart for overnight
Fishing for remaining groups

9:30 Flag Down
Snack time
Prepare for bed

10:00 Lights Out

THURSDAY

7:00 Rise & shine
Wash & dress

7:30 Flag Raising
Breakfast

8:15 Make beds, clean cabins
Cabin Inspection

9:00
- Timber Wolves, Foxes, Antelopes, Fawns → Firearm Safety & Law
- Coyotes, Bob Cats, Lynx, Gophers → Canoe & Boat Safety

10:30
- Timber Wolves, Foxes, Antelopes, Fawns → Canoe & Boat Safety
- Coyotes, Bob Cats, Lynx, Gophers → Firearm Safety & Law

11:45 Free

12:00 Lunch
Rest

1:15
- Timber Wolves, Foxes, Antelopes, Fawns → Fire Prevention & Fire Communication
- Coyotes, Bob Cats, Lynx, Gophers → Fire Equipment Demonstration

THURSDAY (continued)

2:30	Timber Wolves Foxes Antelopes Fawns	Fire Equipment Demonstration
	Coyotes Bob Cats Lynx Gophers	Fire Prevention & Fire Communication
3:30	Free	
4:00	Swim	
5:30	Dinner Rest	
6:45	Open	
9:30	Flag Down Snack Time Prepare for bed	
10:00	Lights Out	

FRIDAY

7:00	Rise & shine Wash & dress	
7:30	Flag Raising Breakfast	
8:15	Make beds, clean cabins Cabin Inspection	
9:00	Timber Wolves Foxes Antelopes Fawns	Archery Mapping Mapping Bird Identification
	Coyotes Bob Cats Lynx Gophers	Fish Collection & Identification Fish Collection & Identification Bird Identification Bird Identification
10:30	Timber Wolves Foxes Antelopes Fawns	Tree Bark Collection Mapping Mapping Tree Bark Collection
	Coyotes Bob Cats Lynx Gophers	Fish Collection & Identification Fish Collection & Identification Bird Identification Tree Bark Identification
11:45	Free	
12:00	Lunch Pack	

WEATHER FORECASTING

Each group will submit a forecast for the next day. This is due by 7:00 p.m.

What to tell:

We predict:

1. Temperature range for the day.
2. Will it rain, be partly cloudy, or mostly clear. Remember it may not be clear and still not rain.
3. Will the pressure rise or fall.

Clues to help you in predicting the above three things:

WIND:

from west	-	clear, bright, cool
from northwest	-	cool
from north	-	clear, cold
from northeast	-	possible rain
from east	-	rain
from southeast	-	heavy rain
from south	-	hot, possible showers
from southwest	-	hot, possible thunder showers

CLOUDS:

none	-	fair
cirrus (feather-like)	-	rain in 24 to 48 hours
stratus (in layers)	-	rain in about 8 hours (with no sun)
cumulus (in small heaps)	-	fair
cumulus (thunder heads)	-	take cover

RAINBOW:

"rainbow at night ..... sailor's delight"
"rainbow in morning ... sailor's take warning"

SUNSET:

ball of fire	-	fair
brilliant red clouds	-	fair
dull & grey	-	bad weather ahead

SUNRISE: red - bad weather ahead

ODDS AND ENDS:

heavy dew or light morning fog	-	fair
insect-catching birds flying high	-	fair
smoke rising high	-	fair
no dew	-	bad weather
insect-catching birds flying low	-	bad weather
smoke hanging low	-	bad weather
barometer rising	-	better weather ahead
barometer falling	-	worse weather ahead

A KEY TO SOME COMMON ROCKS

A. Glassy (appears as if made of glass)
B. Dull or stony (no grains recognizable)
C. Granular (speckled rocks with grains)
D. Foliated or striped (flaked)
E. Cemented fragments or pebbles

A.	Brilliant glassy luster	OBSIDIAN
	If a nail or other steel point will scratch	SLAG
	Cellular or foam-like	PUMICE
A.	Check for slag above	
B.	Soft - can be scratched with fingernail	
B.	Soapy feeling	TALC
B.	Effervesces with dilute acid	CHALK
B.	Harder - can be scratched with knife	
B.	Clay or mud odor (layers usually visible)	SHALE
B.	Effervesces with dilute acid, often has fossils ..	LIMESTONE
B.	Hard - will scratch glass	
B.	Black, dull	BASALT
B.	Various other colors, often slightly flowing lines (check quartzite to be sure)	FELSITE
C.	Even grained	
C.	Easily scratched with steel point	
C.	Effervesces with dilute acid	LIMESTONE
C.	Salty taste (do not taste any chemicals) ...	ROCKSALT
C.	With Quartz	
C.	Hard - made of quartz grains only	
C.	Feels sandy	SANDSTONE
C.	So hard it breaks through grains rather than around them leaving a conchoidal (uneven curved) fracture	QUARTZITE
C.	Hard - Quartz and Feldspar	GRANITE
C.	Without Quartz	
C.	More white than black grains	DIORITE
C.	More black than white grains	GABBRO
C.	Uneven grains	
C.	Large crystals in a fine ground mass	PORPHYRY
C.	"Spots" are fillings of bubble holes in lava basalt	AMYGDALOYD
D.	Medium to coarse grained	
D.	Banded or striped	GNEISS
D.	Mostly mica, foliated	MICA SCHIST
D.	Very fine grained	
D.	Splits into thin "ringing" slabs (check shale to be sure)	SLATE
D.	Soft, soapy feeling, light color	TALC SCHIST
D.	Dark green, smooth feeling, soft	CHLORITE SCHIST
D.	Green to yellow, smooth, foliated, harder than fingernail	SERPENTINE
E.	Rounded pebbles (resembles concrete)	CONGLOMERATE
E.	Angular fragments (resembles terrazzo)	BRECCIA
E.	Fillings of holes in lava	AMYGDALOYD

GUIDE TO ROCK IDENTIFICATION

Rock is the hard solid part of the earth. Rock underlies all the soil and water of the earth. Most of the rocks are made up of a mixture of one or more minerals. Granite, as an example, contains grains of the minerals quartz, feldspar and mica. Some rocks are heavy and massive and seem to contain no mineral grains, but a look at them under the microscope will convince you that even they have mineral grains.

IGNEOUS ROCK

Igneous rocks originate by cooling and solidification of melted rock. Crystals of various minerals grow in the liquids as it cools, producing an interlocking, random arrangement of mineral grains. Volcanic materials sometimes cool so quickly that the ions in the liquid do not have time to become arranged in crystal pattern, thus a glassy rock is formed.

Crystal size and mineral composition make convenient criteria for classifying igneous rocks. Crystal size depends chiefly on rate of cooling and mineral content depends on the chemical composition of the original molten material. A rather simple guide for classification of igneous rocks is included below.

CHART I

	mineral composition	crystals larger than one inch	crystals large enough to identify	crystals too small to identify	glassy no visible crystals
LIGHT COLOR	abundant quartz, light colored feldspar, and few dark colored minerals	PEGMATITE	GRANITE	FELSITE	OBSIDIAN looks like glass
DARK COLOR	no quartz, dark to medium grey feldspar, many dark minerals		GABRO	BASALT	SCORIA looks like a sponge
	no quartz, no feldspar, mostly olivine and other dark minerals		PERIDOTITE		

SEDIMENTARY ROCK

Sedimentary rocks are composed of the remains of preexisting rocks or remains of other materials which generally have been transported to a place where the materials accumulate when the transporting agent loses its ability to move the material any farther. For this reason, many sediments show layering or bedding. A single layer is called a stratum, so sedimentary rocks are usually found in sequences or strata.

Sedimentary rocks are usually placed into three groups according to the manner of their formation. These groups are clastic (fragments of preexisting mineral crys-

tals and rocks) materials, chemical precipitates from water, and organic accumulations. Man made classifications are never complete because nature reacts in so many, many ways and makes so many different combinations of materials.

CHART II

A. Clastic sediments:

Particle size, mm.	Unconsolidated	Lithified
greater than 2	gravel	conglomerate
1/16 to 2	sand	sandstone
1/256 to 1/16	silt	siltstone
less than 1/256	clay	shale

B. Chemical sediments: (usually crystalline texture)
   1. Formed from substances slightly soluble in water
      a. Most limestone, $CaCO_3$
      b. Dolomite, $CaMg(CO_3)_3$
      c. Chert and flint, SiO_2
      d. Hematite beds, Fe_3O_3
   2. Evaporites formed from substances very soluble in water
      a. Gypsum, $CaSO_4 \cdot 2H_2O$
      b. Rock salt, NaCl
      c. Potassium and magnesium salts

C. Organic sediments: (will burn)
   1. Coal series (solids)
      a. Peat, loose accumulations of dead plants - brown color
      b. Lignite, wood structure still visible - dark brown color
      c. Bituminous coal, structure rarely visible - black color
   2. Petroleum (liquid hydrocarbons)
   3. Natural gas (gaseous hydrocarbons)

METAMORPHIC ROCKS

These are alterations of previously existing rocks, either sedimentary or igneous. All metamorphic rock will be crystalline because of the recrystallization of the parent rock. This usually takes place because of extreme pressure and high temperature.

The following chart will contain only the most common:

1. Marble - interlocking crystals of calcite or dolomite - changed limestone or dolomite.
2. Quartzite - interlocking quartz crystals - changed sandstone or chert.
3. Slate - very fine crystals - can be split into thin sheets - changed shale.
4. Schist - formed from slate.
5. Gneiss (pronounced nice) sometimes formed from schist or older igneous rock.
6. Anthracite coal - black, shiny coal formed from bituminous coal.

IDENTIFICATION OF MINERALS

Inspect the mineral sample carefully for the following information:

A. What is its color?
   1. White to light gray, colorless or silver.
   2. Black to dark gray.
   3. Yellow, orange, cream, gold, brass, bronze.
   4. Green.
   5. Red, pink, copper.
   6. Blue, purple, violet.
   7. Brown.

B. Does it have luster?
   1. Metallic or submetallic.
   2. Non metallic, glassy, pearly, dull or earthy, brilliant, silky, resinous or greasy.

C. What streak does it make?
   1. Colorless or white.
   2. Black to grey.
   3. Yellow, orange, green or blue.
   4. Red or brown.

D. Does it have cleavage? (Has it broken so it yields definite plane surfaces?)

E. How hard is it?
   1. Above 7 - not scratched by quartz.
   2. 6 to 7 - scratched by quartz but not steel or glass.
   3. 3½ to 5 ½ - scratched by knife or glass but not penny.
   4. Up to 3½ - scratched by a penny.
   5. 2½ - scratched by fingernail

F. Is it magnetic?

G. Does it have crystalline shape? If so, What?

H. Does it foam with dilute acid? (this should be tried only on a very small space and quickly wiped off)

Definition: "A mineral is a naturally occuring inorganic substance with a chemical composition and physical properties that are uniform or variable within definite limits." They usually have a characteristic internal structure.

A KEY TO SOME COMMON MICHIGAN MINERALS

A	Luster Metallic	B
A	Luster Nonmetallic	K
B	Can be scratched with a fingernail	C
B	Can not be scratched with the fingernail	D
C	Streak - reddish	HEMATITE
C	Streak - black	GALENA
D	Will not scratch glass	E
D	Will scratch glass	H
E	Streak - black	F
E	Streak - colored	G
F	Color - gray	GALENA
F	Color - yellow	CHALCOPYRITE
G	Streak - red	HEMATITE
G	Streak - yellow	LIMONITE or GOETHITE
H	Streak or powder - black	I
H	Streak or powder - colored	J
I	Color - black	MAGNETITE
I	Color - gray to pale yellow	MARCASITE
I	Color - brass yellow	PYRITE
J	Red	HEMATITE
J	Yellow	LIMONITE (Goethite)
K	Streak - black	X
K	Streak - colored	L
K	Streak - white, colorless or too hard to streak	M
L	Red	HEMATITE
L	Yellow	LIMONITE
L	Green	MALACHITE
L	Blue	AZURITE
M	Softer than a penny	N
M	Harder than a penny	Q
N	Cleavage - perfect into thin flexible sheets	O
N	Foliated - (or XLS), if sheets not elastic	P
O	Color - black	BIOTITE MICA
O	Color - white	MUSCOVITE MICA
O	Color - brown	PHLOGOPITE
	1 Red rounded inclusions if present are	GARNET
	1 Brown x or t shaped inclusions are	STAUROLITE
P	Color - dark green	CHLORITE
	2 Black octahedral inclusions may be present	MARTITE
	2 Yellow radiating fibers may be present	GRUNERITE
	2 Red-brown rounded masses may be present	GARNET
P	Color - light green to white, soapy feel	TALC
P	Color - light. If XLS very sparkly - if sheets not elastic or masses of needle-like XLS	GYPSUM
Q	Will not scratch glass (three direction cleavage)	R
Q	Will scratch glass (Cleavage less than three directions)	U
R	Effervesces in acid	S
R	No reaction to acid	T
S	Strong reaction to acid, perfect rhombic cleavage	CALCITE
S	Reaction to acid only if powdered, curved rhombic XLS	DOLOMITE
T	Salty taste, cubic cleavage (students should not taste)	HALITE or rock salt
T	Heavy white or pale blue, banded XLS or massive with fracture lines	CELESTITE
U	Good cleavage, pearly surface, many colors, scratched by quartz	FELDSPAR
U	Conchoidal fracture	QUARTZ family
	many varieties, all colors and clear - red to yellow jasper - waxy gray to blue and banded chalcedony and white to tan chert are common	
U	Other fractures	V
V	Light green color	EPIDOTE

V	Dark green to black color - - - - - - - - - - - - -	W
W	Cleavage 90° - - - - - - - - - - - - - - - - -	AUGITE
W	Cleavage 55° to 125° - - - - - - - - - - - - - (found with quartz bearing rock, looks like coal)	HORNBLENDE
X	Radiating fibers - - - - - - - - - - - - - - - -	MAGNETITE
X	Massive, magnetic (will pick up iron particles or be attracted to a magnet) - - - - - - - - - - - - -	MAGNETITE
X	Tends to cleave into flat plates (bits may be picked up by a magnet) - - - - - - - - - - - - - - -	ILLMENITE

CLUES FOR SOME UPPER PENINSULA TREES

1. Leaves needlelike, awl-shaped, strap shaped or scale like - - - - 2

1. Leaves broad, mostly more than 2 inches long - - - - - - 12

2. Leaves in clusters of 2 to many - - - - - - - - - 3

2. Leaves solitary, not clustered - - - - - - - - - 8

3. Leaves in clusters of 2-5, sheathed, stay on several years, Pinus family - 4

3. Leaves mostly in tufs of 8 to many on short spurs, slender dark needles about 1 inch long, deciduous in autumn - TAMARACK (Larix laricina)

4. Leaves in clusters of 5, cones 4-10 inches long - WHITE PINE (P. strobus)

4. Leaves in clusters of 2, cones less than 4 inches long - - - - 5

5. Leaves 1-3 inches long - - - - - - - - - - - 6

5. Leaves 3-6 inches long - - - - - - - - - - - 7

6. Leaves ½-1½ inches long divergent cones attached directly to stem (sessile) pointing toward tip of branch, cones small and hard, common in dry sandy places - JACK PINE (P banksiana)

6. Leaves 1½-3 inches long, slightly divergent, light-colored, cones point away from tip of branch, bark orangish - SCOTCH PINE (P. sylvestvis)

7. Bark of trunk red-brown, cones about 2 inches long, needles snap cleanly when broken, rounded but slightly flat on inside - RED PINE or NORWAY PINE (P. resinosa)

8. Leaves opposite - - - - - - - - - - - - 9

8. Leaves alternate or spirally-whorled - - - - - - - - 10

9. Twigs flattened, leaves all of one kind, scale-like, run down on to stem (decurrent), small pale-brown cone - NORTHERN WHITE CEDAR (also called ARBOR VITAE) (Thuja occidentalis)

9. Twigs generally round, leaves of two kinds (either scale-like or awl-shaped, perhaps on same branch), fruit bluish-berrylike - RED CEDAR (Juniperus virginiana)

10. Leaves flattened, soft to the touch - - - - - - - - 11

10. Leaves 4-sided, nearly square, harsh to touch, arranged in spirals around twig BLACK SPRUCE (Picea mariana)

11. Leaves ½-1½ inch long, attached directly to stem, aromatic, comes 2-4 inches long, bark with raised blisters containing resin - BALSAM FIR (Abies balsamea)

11. Leaves seldom over ½ inch long, short, flat, with 2 underneath side, in 2 flattened rows when fresh, darker top side, cones about 3/4 inch long - HEMLOCK (Tsuga canadensis)

12. Leaves compound (several blades joined to a central stalk) - - - - 13

12. Leaves simple (one blade) - - - - - - - - - - - 15

13. Leaves opposite - - - - - - - - - - - - - 14

13. Leaves alternate - - - - - - - - - (not in U.P.)

14. Leaflets elliptical to oval (usually 7), sparingly toothed, dark green above paler, silvery beneath, fruits are single "keys" with long narrow wing - WHITE ASH (Fraxinus americana)

14. Leaflets somewhat oblong, dark green (blakish in shade), 7-11 leaflets are finely toothed and hairy along veins, winged fruit has a conspicuous notch at base - BLACK ASH Fraxinus nigra)

15. Leaves opposite - - - - - - - - - - - - - 16

15. Leaves alternate - - - - - - - - - - - - - 18

16. Veins run fanlike from base of leaf - - - - - - - - 17

16. Veins run outward from central vein, then curve parallel to margin - snow white flowers in north, pinkish or reddish in south - DOGWOOD (Cornus florida)

17. Under surface green, 5 lobes are not toothed at margins, lobe angle U shaped SUGAR MAPLE (Acer saccharum)

17. Under surface white or silver, 5 lobes are toothed at margins, lobe angle V shaped, buds are rich, smooth, crimson - RED MAPLE (Acer Rubrum)

18. Twigs armed with thorns, only heavily thorned tree with sharply-toothed, single leaves - at least 165 species so we go no farther - HAWTHORN

18. Twigs not armed - - - - - - - - - - - - - 19

19. Leaves out into evident segments or lobes - - - - - - - 20

19. Leaves unlobed, but may be toothed or wavy - - - - - - - 23

20. Leaves spicy when chewed - SASSAFRAS (not in U.P.)

20. Leaves bitter, or with little taste - - - - - - - - 21

21. Leaves on long stems, 4 lobes, circular - TULIP (not in U.P.)

21. Leaves short stemmed, 5 or more lobed, not circular - - - - - 22

22. Lobe tips rounded, 5-9 rounded lobes, large pointed acorns in shallow cups, bark light gray - WHITE OAK (Quercus alba)

22. Lobe tips ending in hair or bristle, middle lobe largest, midrib often red, 1 inch oblong nut with white meat and shallow saucer - RED OAK (Quercus borealis)

23. Leaf stem flat, leaf trembles in slightest breeze, alternate on twig, leaf almost round, these belong to the poplar family - you should check out QUAKING ASPEN (Populus tremuloides), BIG TOOTH ASPEN (Populus grandidentata), BALSAM POPLAR (Populus tacamahacca), and COTTONWOOD (Populus deltoides)

23. Leaf stem circular in cross section - - - - - - - - - 24

24. Leaf margin smooth, not toothed or wavy - - - - (not in U.P.)

24. Margin toothed or wavy - - - - - - - - - - - - 25

25. Margin with large rounded teeth or wavy - - - - (not in U.P.)

25. Margin with sharp teeth - - - - - - - - - - - 26

26. Chewed twigs have wintergreen taste - - - - - - - - 27

26. Twigs lack wintergreen taste - - - - - - - - - 28

27. Bark smooth and black - BLACK BIRCH (not in U.P.)

27. Bark papery, yellowish, leaves nearly oval, double-toothed, 3-4 inches long underside paler than top - YELLOW BIRCH (Betula lutea)

28. Margins with single teeth - - - - - - - - - - - 29

28. Margins with double teeth - - - - - - - - - - - 32

29. Leaf circular or heart shaped - BASSWOOD, also called LINDEN (Tilia americana)

29. Leaf elliptical - - - - - - - - - - - - - 30

30. Margin with fine teeth, most are shrubby, alternate leaves, grayish brown smooth bark - known as SERVICEBERRY, SHADBUSH, and SHADBLOW (Amelanchier canadensis)

30. Margin with coarse teeth - - - - - - - - - - - 31

31. Teeth ending in fine bristles - CHESTNUT (not in U.P.)

31. Teeth not bristle tipped, leaf has papery rattle, distinctive smooth gray bark, long pointed buds, fruit is a triangular nut - AMERICAN BEECH (Fagus graudifolia)

32. Leaf triangular, bark whitish - GRAY BIRCH (generally not in U.P.)

32. Leaf elliptical, bark dark - - - - - - - - - - - 33

33. Teeth coarse, leaf base lopsided - AMERICAN ELM (Ulmus americana)

33. Teeth fine, leaf base usually symmetrical - - - - - - - - 34

34. Whitish (later reddish) hair along base of midrib, twigs have bitter almond taste leaf has incurving teeth - BLACK CHERRY (Prunus serotina)

34. Leaves smooth or sparingly hairy - - - - - - - - - - 35

35. Bark bluish gray, trunk twisted with muscular ridges, leaves similar to Hop Hornbeam but smaller, darker and more shiny, AMERICAN HORNBEAM also known as BLUE BEECH (Carpinus caroliniana)

35. Bark brownish, finely flaked, fruit resemble oval paper bags, leaves flannel soft with fine sharp teeth HOP HORNBEAM also known as IRONWOOD (Ostrya virginiana)